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### Computer Modeling of a Tritrophic System

In the natural world, there seems to be patterns that exist within ecosystems, yet our understanding of them is not perfect. For example, when trying to understand a predator-prey system (for example, foxes and rabbits living in the same space) mathematicians try to take population data from the environment and formulate an abstraction of the real system to discover fundamental truths about species interactions using various methods. Despite extensive work on this problem, many modeling systems are limited in what they can describe about the real world. Here, we describe ways to try and improve our current models to be more biologically accurate so that in the future we can make more accurate predictions about how the environment will change in response to certain ecological factors. We are approaching this using two different methods, firstly using a computer simulation to try and recreate naturally occurring data, and secondly taking a dynamical systems approach to describe the changing populations.

I will address the computer modeling system in this presentation. I used Netlogo to simulate a situation where wolves, sheep, and grass interact in a tritrophic system. I altered a model from the Netlogo model library and adjusted the parameters to fit the tritrophic model we were working on. Then we compared the parameters of the computer model to the parameters of the dynamical systems approach. We matched the parameters of the models to see if the models would produce the same result. Then we compared the results of the models to see the similarities, differences, strengths, and weaknesses.